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# *Hybrizon* Fallén (Hymenoptera, Ichneumonidae, Hybrizoninae) found in Hunan (China)

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## Abstract

The species of the genus *Hybrizon* Fallén (Hymenoptera: Ichneumonidae: Hybrizoninae) from China are reviewed, with special reference to Hunan (South China). The genus *Hybrizon* and two species (*H. flavofacialis* Tobias, 1988, and *H. ghilarovi* Tobias, 1988) are reported for the first time from the Oriental region. The species known from the Palaearctic and Oriental regions are keyed.

**Keywords**

Ichneumonidae, *Hybrizon flavofacialis*, *Hybrizon ghilarovi, Lasius fuyi*, Oriental, China, Hunan, koinobiont endoparasitoids, ant larvae, key

## Introduction

The small subfamily Hybrizoninae Blanchard, 1845 (= Paxylommatinae Foerster, 1862, Hybrizontinae of authors, "Hybrizonites" of Blanchard, 1845; Wharton and van Achterberg 2000) is associated with ants and most likely belongs to the family Ichneumonidae, but was often associated with Braconidae (van Achterberg 1976) or considered to be a separate family (He 1981, Tobias 1988). The group is treated as a subfamily of the family Ichneumonidae Latreille, 1802, by Rasnitsyn (1980)

and Yu and Horstmann (1997) because of the structure of the connection of the second and third metasomal tergites and the venation of the hind wing, both indicate a closer relationship with the family Ichneumonidae (Sharkey and Wahl 1987; Wahl and Sharkey 1988) than with the Braconidae. From analysis of the 28S ribosomal RNA from the genus *Hybrizon* Fallén, 1813, it may be concluded that the Hybrizoninae are at a basal position of the Ichneumonidae-lineage (Belshaw et al. 1998; Quicke et al. 2000; Belshaw and Quicke 2002), but Gillespie et al. (2005) documented the unusual structure of 28S in *Hybrizon*, which makes alignment difficult. Quicke et al. (2009) found that *Hybrizon* likely is a derived subfamily within the ophioniformes-group of the Ichneumonidae, which agrees with the derived morphology of the Hybrizoninae.

The subfamily is known only from the Holarctic region and we report for the first time two species of the genus from the Oriental part of China. There are only two reports of the genus *Hybrizon* from China (He 1981, Konishi et al. 2012) but only from Palaearctic northern China (*H. buccatus* (de Brébisson, 1825) from Jilin and Heilongjiang and *H. ghilarovi* Tobias, 1988, from Jilin). The second author collected in Hunan province two species of the genus, resulting in an enormous extension of the known distribution by 2200+ km southwards.

The biology of the Hybrizoninae has been for long time uncertain, but recently oviposition has been documented by photographing and filming two different genera (Komatsu and Konishi 2010; Gómez Durán and van Achterberg 2011). It shows that the final instar ant larva is used for oviposition when the worker ants transport the larvae outside the nest. Of one species (*H. buccatus*) we have some host records indicating that predominantly ant larvae from the subfamily Formicinae (Formicidae) are selected, but also larvae from non-Formicinae may be used (Gómez Durán and van Achterberg 2011). It is too early to conclude a lack of specialisation, because in most cases the true nature of the associations has not really been established and the host associations are largely unknown for the other species.

## Material and methods

The collecting site is at the border of the Southeast Lake near Yuanjiang (N. Hunan) in the common reed (*Phragmites australis* (Cav.)) zone, with Oriental "*Lasius fuliginosus*" (= *Lasius fuyi* Radchenko, 2005; see Radchenko 2005) as possible host. The collecting in this wetland habitat along the lake was rather cumbersome and done by hand netting among the common reed.

For references to genera and species of Hybrizoninae, see Yu et al. (2009) and updates, for the East Palaearctic species, see Konishi et al. (2012) and for morphological terminology, see van Achterberg (1988). The specimens are deposited in the College of Bio-Safety Science and Technology, Hunan Agriculture University (HUNAU) at Changsha and in the NCB Naturalis collection (RMNH) at Leiden.

## Systematics

### Genus *Hybrizon* Fallén, 1813

Figs 1–15

*Hybrizon* Fallén, 1813: 19 (no species); Shenefelt 1969: 2; Marsh 1979: 313; Tobias 1988: 133–134 (key to Palaearctic species); Marsh 1988: 30–31 (key to Nearctic species); van Achterberg 1999: 17–18 (key to Palaearctic species); Gómez Durán and van Achterberg 2011: 94–99 (biology); Konishi et al. 2012: 20 (key to East Palaearctic species). Type species (by subsequent monotypy): *Hybrizon latebricola* Nees, 1834 (= *Hybrizon buccatus* (de Brébisson, 1825)).

*Paxylomma* de Brébisson, 1817: 66 (no species); Shenefelt, 1969: 2 (as synonym of *Hybrizon* Fallén, 1813); Marsh 1979: 313 (id.), 1988: 30 (id.); Tobias 1988: 133 (id.). Type species (by subsequent monotypy): *Paxylomma buccata* de Brébisson, 1825.

*Paxyloma* Stephens, 1835: 119; Shenefelt 1969: 2. Misspelling for *Paxylomma* de Brébisson, 1817.

*Paxylomme* Wesmael, 1835: 88; Shenefelt 1969: 2. Misspelling for *Paxylomma* de Brébisson, 1817.

*Paxyllomma* Curtis, 1837: 115; Shenefelt 1969: 2. Misspelling for *Paxylomma* de Brébisson, 1817.

*Paxylloma* Blanchard, 1840: 335; Shenefelt 1969: 2. Misspelling for *Paxylomma* de Brébisson, 1817.

*Pachylomma* Ratzeburg, 1848: 53; Shenefelt 1969: 2. Invalid emendation of *Paxylomma* de Brébisson, 1817.

*Plancus* Curtis, 1833: 188; Shenefelt 1969: 2 (as synonym of *Hybrizon* Fallén, 1813); Marsh 1979: 313 (id.), 1988: 30 (id.); Tobias 1988: 133 (id.). Type species (by monotypy): *Plancus apicalis* Curtis, 1833 [examined; = *Hybrizon buccatus* (de Brébisson, 1825)].

*Eupachylomma* Ashmead, 1894: 58; Shenefelt 1969: 1 (as valid genus); Marsh 1979: 313 (as synonym of *Hybrizon* Fallén, 1813), 1988: 30 (id.). Type species (by original designation): *Wesmaelia rileyi* Ashmead, 1889.

### Species occurring in China

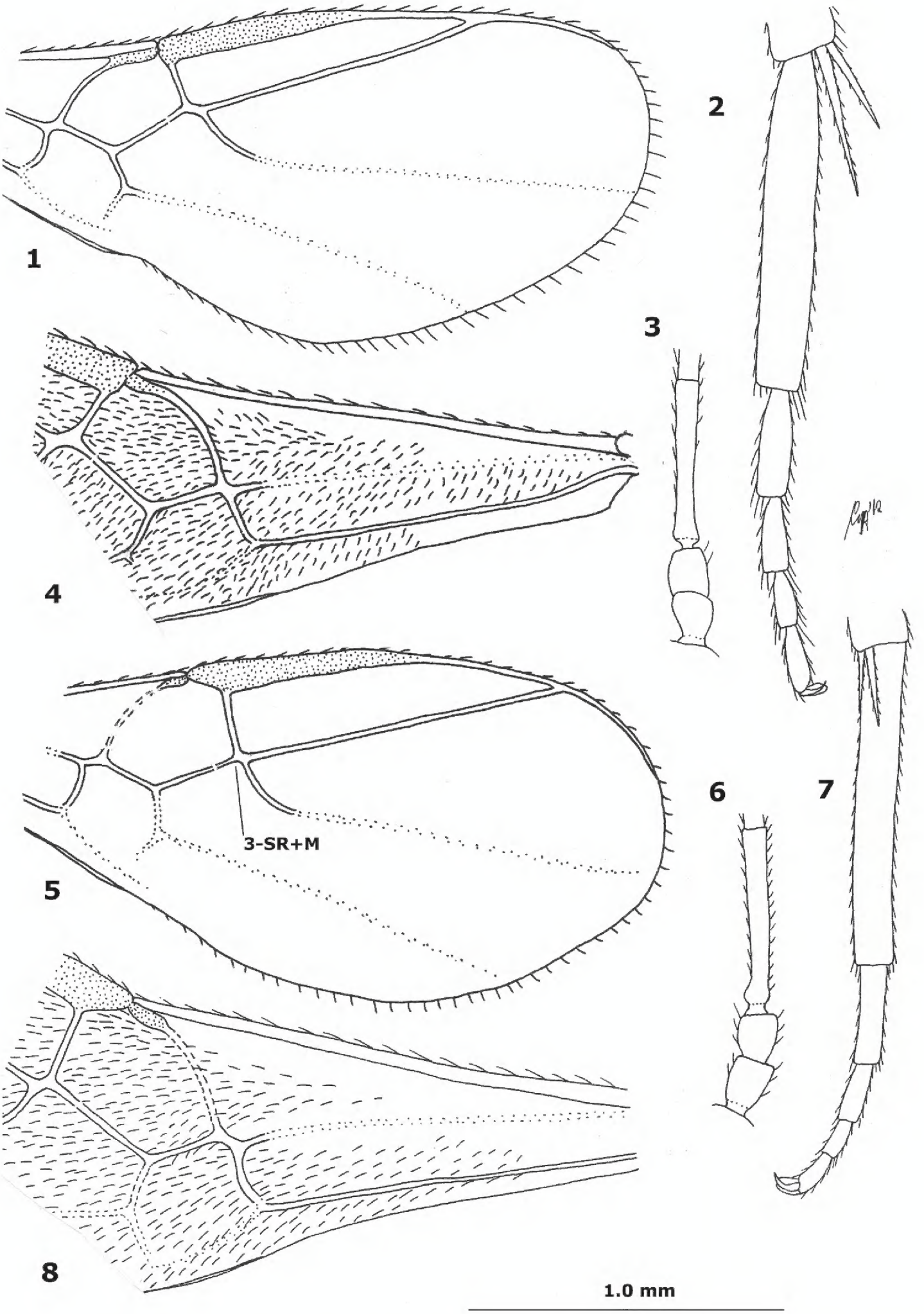
#### *Hybrizon buccatus* (de Brébisson, 1825)

http://species-id.net/wiki/Hybrizon_buccatus

Figs 9–13

**Material.** Reported from North China by He (1981: Heilongjiang, Jilin) and by Konishi et al. (2012: Jilin). Unknown from Oriental China.

**Diagnosis.** Basal cell of fore wing largely glabrous, with at most 15 setae (Fig. 10); scapus somewhat smaller than pedicellus (Fig. 11); third antennal segment comparatively




**Figures 1–8. 1–4** *Hybrizon flavofacialis* Tobias, female, China, Hunan, Yuanjiang **5–8** *H. ghilarovi* Tobias, female, China, Hunan, Yuanjiang **1, 4** apical half of fore wing **2, 6** three basal antennal segments **3, 7** hind basitarsus lateral **4, 8** basal half of fore wing. **1** scale-line (= 1.0×); **2**=1.7×; **3, 6–8**=1.4×; **4, 5** =1.1×.

stout (Fig. 11); ventral half of face and scutellum largely smooth; maximum width of face 1.4–1.5 times its minimum width; eyes glabrous; mesoscutum with pair of bands of distinct punctures, rarely punctures absent or obsolescent; scutellum (except sometimes laterally) and notaulic area of mesoscutum usually dark brown; propodeum largely smooth or granulate, except for medial carinae and posteriorly with weak or obsolescent curved carinae; vein 1-M of fore wing distinctly curved anteriorly (Figs 9, 10); vein r of fore wing issued comparatively close to base of pterostigma (Fig. 9); vein 1-M of fore wing paler than vein 2-CU1 of fore wing; in lateral view length of hind basitarsus 4–5 times its maximum width (Figs 12, 13); ventral half of metapleuron coriaceous; sparsely setose part of ovipositor sheath 0.2–0.3 times as long as second tergite; length of fore wing 2–3 mm.

### *Hybrizon flavofacialis* Tobias, 1988

http://species-id.net/wiki/Hybrizon_flavofacialis

Figs 1–4

**Material.** 3 ♀ + 22 ♂ (HUNAU, RMNH), S. China: Hunan, Yuanjiang, Southeast Lakeside, Ben-Zhu Dai, together with *Lasius "fuliginosus"* (= *L. fuyi* Radchenko): 2 ♂, 3.VI.1989; 1 ♀ + 1 ♂, 4.VI.1989; 2 ♂, 8.X.1989; 11 ♂, 9.X.1989; 1 ♀ + 7 ♂, 10.X.1989; 1 ♀, 12.X.1989.

**Diagnosis.** Face yellow; eyes glabrous; pedicellus wider and slightly longer than scapus (Fig. 3) and dark brown, contrasting with yellowish scapus; third antennal segment comparatively slender (Fig. 3); maximum width of face 1.2–1.3 times its minimum width; ventral half of face and scutellum more or less granulate; distance between posterior ocelli of female about 1.5 times diameter of ocellus (about twice in male); mesoscutum antero-laterally smooth; ventral half of metapleuron rugose or densely rugulose; posteriorly propodeum with strong curved carinae (but sometimes disappearing in rugosity); basal cell of fore wing (except basally) with 50–70 setae (Fig. 4); vein r issued at base of pterostigma (Fig. 1); vein 3-SR+M of fore wing medium-sized (Fig. 1); vein 1-M of fore wing weakly and gradually curved anteriorly or straight (Fig. 4); in lateral view length of hind basitarsus 6–7 times its maximum width (Fig. 2); sparsely setose part of ovipositor sheath 0.2–0.4 times as long as second tergite.

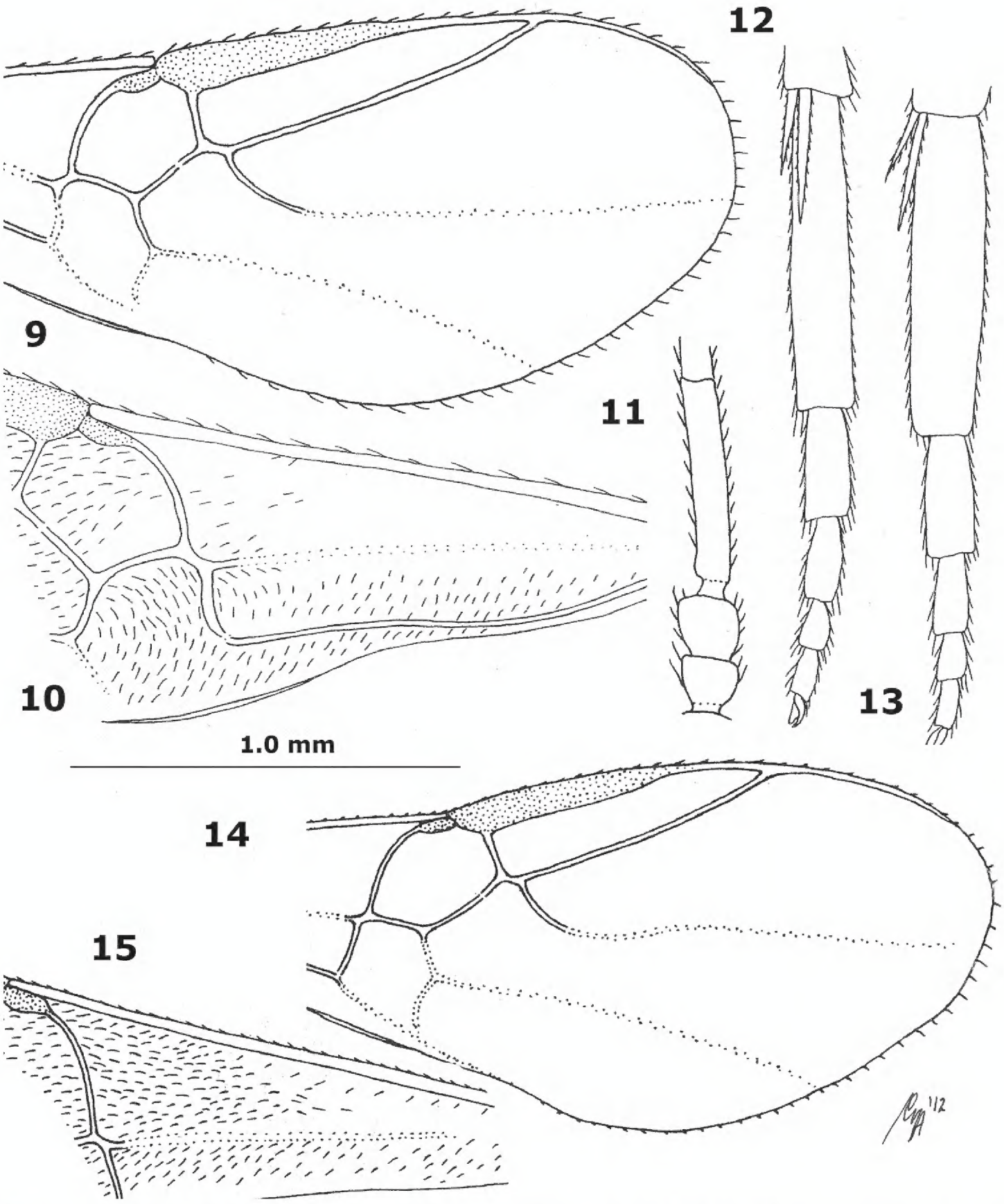
**Notes.** Up to now only known from the holotype from Far East Russia (Khabarovsk kray). The holotype is illustrated by Konishi et al. (2012). New for China and for the Oriental region.

### *Hybrizon ghilarovi* Tobias, 1988

http://species-id.net/wiki/Hybrizon_ghilarovi

Figs 5–8

**Material.** 10 ♂ + 5 ♀ (HUNAU, RMNH), S. China: Hunan, Yuanjiang, Southeast Lakeside, together with *Lasius "fuliginosus"* (= *L. fuyi* Radchenko), Ben-Zhu Dai: 2 ♀




**Figures 9–15. 9–13** *Hybrizon buccatus* (de Brébisson), female, Bulgaria, Brodilovo, but **13** of female from Netherlands, Nunspeet **14–15** *H. pilialatus* Tobias, female, Italy, Funes **9, 14** apical half of fore wing **10, 15** basal half of fore wing **11** three basal antennal segments **12, 13** hind basitarsus lateral. **9** scale-line (=1.0×); **10–13**=1.3×; 1**4, 15** from van Achterberg (1999).

+ 2 ♂, 10.X.1989; 1 ♂, 14.V.1989; 3 ♂, 25.V.1989, Lan-Shao You; 1 ♀, 4. VI.1989; 2 ♂, 8.X.1989; 2 ♀, 9.X.1989; 1 ♂, 11.X.1989; 1 ♂, 3.VI.1989.

**Diagnosis.** Eyes distinctly setose; face dark brown, except near its tentorial pits; distance between posterior ocelli of female about 1.6 times diameter of ocellus; pedicellus

about as wide as scapus and slightly shorter than scapus (Fig. 6), ventrally similarly yellowish coloured as scapus; third antennal segment comparatively slender (Fig. 6); maximum width of face 1.2–1.3 times its minimum width; ventral half of face and scutellum more or less granulate; area behind malar space flat or nearly so and rugose; scutellum granulate; propodeum areolate; ventral half of metapleuron largely rugose or rugulose; length of hind basitarsus about 7 times its maximum width (Fig. 7); mesoscutum antero-laterally rugulose; ventral half of metapleuron rugose or densely rugulose; vein r issued after base of pterostigma (Fig. 8); vein 3-SR+M of fore wing often short (Fig. 5); vein 1-M of fore wing weakly developed, straight anteriorly or nearly so (Fig. 5); basal cell of fore wing with 30–40 setae (Fig. 8); marginal cell of fore wing 4.0–5.5 times longer than its maximum width (Fig. 5); vein SR1 of fore wing straight (Oriental China) or sinuate (typical); posteriorly propodeum with strong curved carinae (but sometimes disappearing in rugosity); sparsely setose part of ovipositor sheath 0.6–0.7 times as long as second metasomal tergite.

**Notes.** A female paratype is illustrated by Konishi et al. (2012). Up to recently only known from Far East Russia and Bulgaria, but Konishi et al. (2012) report this species from NE China (Jilin), Korea and Japan. New for the Oriental region.

The Old World species can be separated as follows:

## Key to Old World species of the genus *Hybrizon* Fallén

1 Basal cell of fore wing largely glabrous, with at most 15 setae (Fig. 10); posteriorly propodeum with weak or obsolescent curved carinae; in lateral view length of hind basitarsus 4–5 times its maximum width (Figs 12, 13); vein 1-M of fore wing distinctly curved anteriorly (Figs 9, 10); third antennal segment less slender (Fig. 11); ventral half of face and scutellum largely smooth; ventral half of metapleuron coriaceous; maximum width of face 1.4–1.5 times its minimum width..... **2**

– Basal cell of fore wing (except basally) more or less setose (Figs 4, 8, 15); posteriorly propodeum with strong curved carinae (but sometimes disappearing in rugosity); in lateral view length of hind basitarsus 6–7 times its maximum width (Figs 2, 7); vein 1-M of fore wing weakly and gradually curved anteriorly or straight (Figs 4, 8, 15); third antennal segment comparatively slender (Figs 3, 6); ventral half of face and scutellum more or less granulate; ventral half of metapleuron rugose or densely rugulose; maximum width of face 1.2–1.3 times its minimum width ..... **3**

2 Vein r of fore wing issued comparatively far removed from base of pterostigma; mesoscutum without bands of punctures, at most with some punctures; vein 1-M of fore wing as dark as vein 2-CU1 of fore wing; scapus about as large as pedicellus; scutellum (except medio-anteriorly) and more or less notaulic area of mesoscutum ivory; length of fore wing 3.0–3.6 mm; propodeum distinctly rugose-granulate; Spain, South Korea ..... ***H. juncoi*** (Ceballos, 1957)

– Vein r of fore wing issued comparatively close to base of pterostigma (Fig. 9); mesoscutum with pair of bands of distinct punctures, rarely punctures largely absent or obsolescent; vein 1-M of fore wing paler than vein 2-CU1 of fore wing; scapus somewhat smaller than pedicellus (Fig. 11); scutellum (except sometimes laterally) and notaulic area of mesoscutum usually dark brown; length of fore wing 2–3 mm; propodeum largely smooth or granulate, except for medial carinae; Northwest and East Palaearctic ..... ***H. buccatus* (de Brébisson, 1825)**

3 Eyes distinctly setose; pedicellus about as wide as scapus and about as long scapus (Fig. 6), ventrally similarly yellowish coloured as scapus; vein 1-M of fore wing straight anteriorly or nearly so (Fig. 8); sparsely setose part of ovipositor sheath 0.6–0.7 times as long as second metasomal tergite; vein 3-SR+M of fore wing often short (Fig. 5); East Palaearctic (Far East Russia); China (*Hunan, Jilin), South Korea, Japan (Hokkaido); Southeast Europe (Bulgaria) ..... ***H. ghilarovi* Tobias, 1988**

– Eyes glabrous; pedicellus wider and slightly longer than scapus and dark brown, contrasting with yellowish scapus; vein 1-M of fore wing weakly curved anteriorly (Figs 1, 14); sparsely setose part of ovipositor sheath 0.2–0.4 times as long as second tergite; vein 3-SR+M of fore wing medium-sized (Fig. 1) ..... **4**

4. Face yellow; vein r of fore wing issued at base of pterostigma (Fig. 1); distance between posterior ocelli of female about 1.5 times diameter of ocellus (but about twice in male); East Palaearctic (Far East Russia); *China (Hunan)..... ..... ***H. flavofacialis* Tobias, 1988**

– Face dark brown, except near its tentorial pits; vein r of fore wing issued distinctly removed from base of pterostigma (Fig. 14); distance between posterior ocelli of female usually about twice diameter of ocellus; West Palaearctic ..... ***H. pilialatus* Tobias, 1988**

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